



SIEMENS

Ingenuity for life

COMOS – Making data work.

Better quality decision-making
throughout the plant's entire lifecycle

[siemens.com/comos](https://www.siemens.com/comos)



Innovation in the service of industry

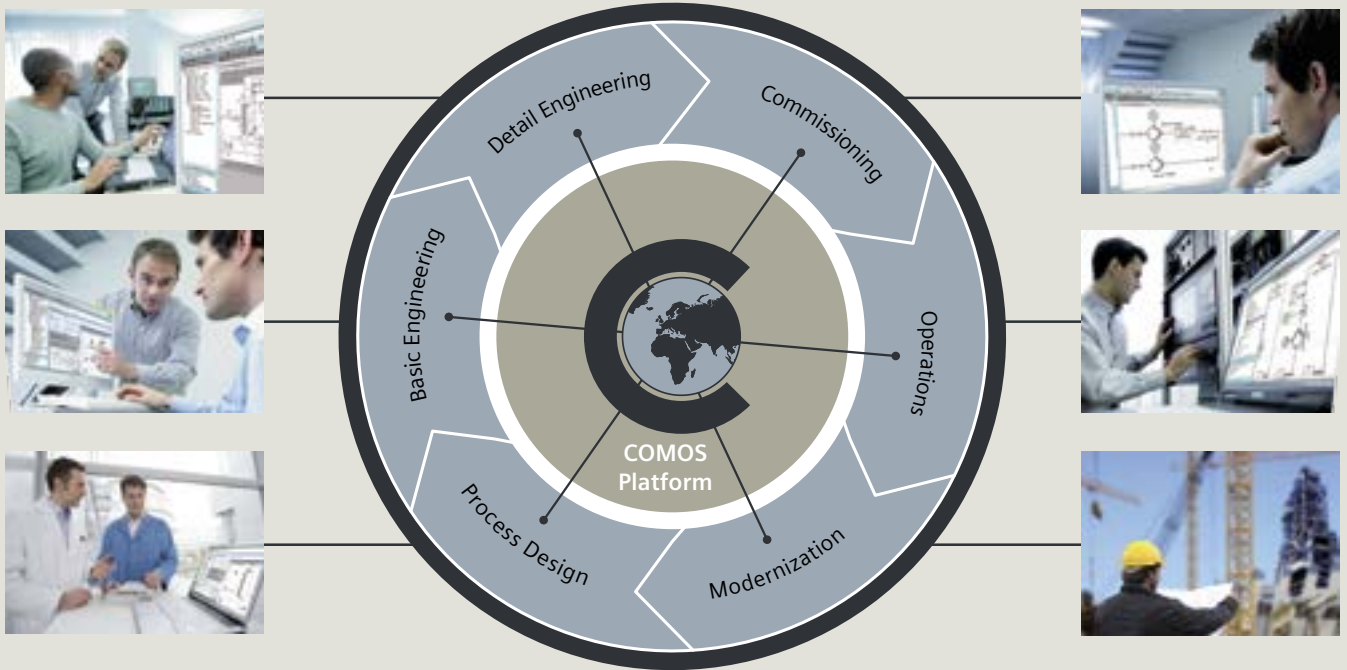
COMOS is the result of our comprehensive technological expertise and many years of experience in a wide range of different industrial sectors. Given the highly dynamic markets in which our customers need to succeed, we are continuously developing our innovative solutions in line with the growing challenges facing the process industry.

COMOS offers plant management with new perspectives

Global competition, shorter innovation cycles, increasingly stringent legal regulations for safety and environment protection, as well as a rising demand for individualized products pose enormous challenges for plant engineers and operators. This calls for innovative solutions like COMOS, which can economically optimize productivity, quality, and flexibility – throughout the entire plant lifecycle.

Efficiency through a common, up-to-date database

With COMOS, Siemens is the only company in the world to offer the process industry a software solution for the integrated management of plant projects – from engineering and operations to modernization as well as dismantling. COMOS ensures that engineers and operators can access all project-relevant data at all times, across all company levels and in all project phases. COMOS offers a seamless flow of information by providing a common database. Because all data is always available and up-to-date, it depicts the actual as-built status of a plant at all times. In this way, COMOS lays the foundation for greater reliability in decision-making and more efficient processes throughout the entire plant – for a lasting improvement in competitiveness.



How can I boost the efficiency of my plant throughout its entire lifecycle?

How can I successfully adapt to ever-shorter innovation cycles?

How can I reliably manage increasingly complex data volumes?

COMOS – Making data work.

COMOS provides the process industry with a seamless flow of information based on a globally consistent database – delivering a common view of data across all disciplines and through all phases of the plant lifecycle. This is possible thanks to the systematic application of object orientation in our groundbreaking software solutions. Plant engineers and operators have access at all times to data that is always up-to-date – in real time, independent of time zones. That creates the basis for maximum reliability in decision-making, which allows for considerably greater productivity, efficiency, and flexibility in all processes.

That is what we mean by COMOS – Making data work.



COMOS improves your competitiveness

End-to-end coverage of the complete plant lifecycle with COMOS opens up new possibilities for successful enterprise management and engineering. It allows you to turn innovations into market successes faster and minimize total cost of operation while safeguarding your investments. This increased operating efficiency boosts your company's profitability and growth and as a result improves your competitiveness.

Optimization over the entire plant lifecycle

With COMOS, Siemens provides you with intelligent solutions and services that are optimally tuned to your business processes and your industry-specific operating routines – all from a single source. In all phases from design through installation, start-up, and operation to maintenance and modernization, our comprehensive and innovative solution portfolio lets you make full use of the optimization potential in every phase of your plant's lifecycle. This allows you to optimize your market position and competitiveness on an ongoing basis.

Faster time-to-market

COMOS speeds up the process from product development to product launch. This allows you to profit, for example, from shorter engineering cycles through the consolidation of engineering applications, which results in a significantly reduced number of applications. Harmonized project steps and concurrent processes ensure shorter project lead times. The potential for global collaboration also helps reduce time-to-market because decision-makers can access all object data and documents worldwide, independent of time zones and in real time.

COMOS provides industry-specific solutions for the process industry



Pharmaceuticals



Chemicals

Minimizing operating costs through a holistic approach to all process sequences

Unlike the conventional solutions available, COMOS does not treat plants separately according to technical areas and disciplines but rather on a function-oriented basis. Our software solution systematically implements the complete integration of all process sequences – both in the engineering and the operating phase. This close interaction of the individual phases plays a crucial part in increasing plant availability and reliability.

You also profit from enormous savings thanks to consistent data transfer throughout the entire plant lifecycle, and it is quite common for total costs to be reduced by half. Naturally, data consistency and high data quality also minimize your maintenance costs in operation. Another advantage is the substantial amount of time saved by a reduction in data complexity due to integration of the process steps.

Innovation and investment security


Our many years of experience in plant management with various industries worldwide are reflected in every aspect of our solution concepts. The advantage for you is that we can meet your specific requirements efficiently. When developing new solutions, we pay close attention to system compatibility in order to guarantee smooth integration into existing IT landscapes and to safeguard your investments.



Oil & Gas



Energy & power plant technology

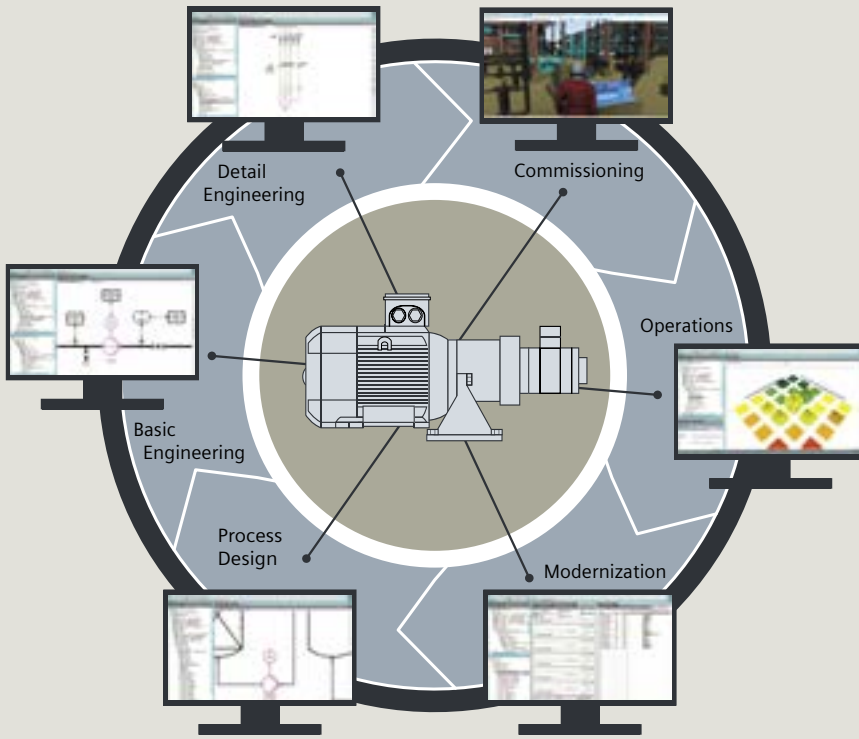


COMOS provides you with the basis for maximum reliability in decision-making

COMOS makes the entire plant lifecycle transparent. This is done by using common standards and freely configurable interfaces based on a single data platform. This enables COMOS to facilitate collaboration among all disciplines, because complete, consistent, and up-to-date data is available to everyone involved in the project. This improves mutual communication and allows faster and more efficient decision-making and action, if required.

Data consistency through interoperability

One problem with conventional engineering systems is ensuring consistent data storage. As a rule, every tool ensures consistency only within its own system environment. Common standards and freely configurable interfaces are the only way to create a truly open system architecture and that allows the seamless interaction of different systems and that is always up-to-date – across platform boundaries. This is precisely where COMOS comes in, providing an open system with a common database and systematically applied object orientation.



Integrated collaboration among all disciplines over the entire lifecycle:

- Process Engineering
- Piping
- Isometrics
- 3D Integration
- Electrical, Instrumentation & Control
- Automation
- Control System Planning
- Pneumatic & Hydraulic Planning
- Training & Simulation
- Maintenance
- Shutdown & Modernization Planning
- Project & Plant Documentation

Object orientation in COMOS: All object specifications are available everywhere and at all times

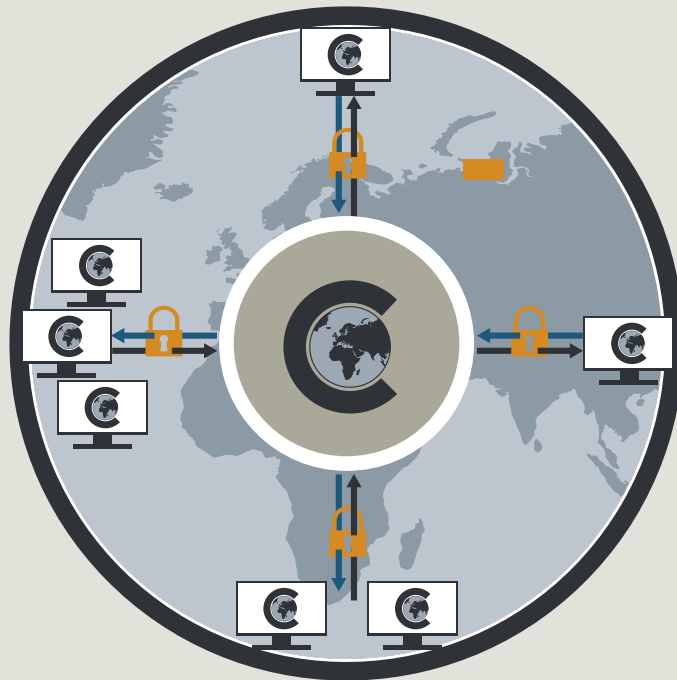
Technology leadership through object orientation

COMOS is the innovative realization of a systematic object-oriented solution approach in which the emphasis is placed on the complete end-to-end flow of data throughout the entire lifecycle. This means that all data relating to the same component (such as a pump, for example) form a unit – an object. Each object exists only once in the COMOS database. Any modifications made to specifications in a particular technical area or phase can therefore always be seen at the respective object. They are visible for all disciplines, and are stored in the central database as a reliable and consistent source of data. All the latest relevant data and properties of an object are available everywhere and at all times to each person working on that object. This reduces data complexity and makes a key contribution to improving quality and optimizing work processes.

Advantages realized through object orientation

- Integrated and consistent plant management
- Optimization of engineering processes
- Reduced data complexity
- Shorter process cycle times
- Close interaction between the engineering and operating phases
- Efficient plant support strategy
- Flexible application options in all disciplines and all lifecycle phases of a plant project
- Shorter development time for new products and processes

Global plant management
on a common database
without any data loss



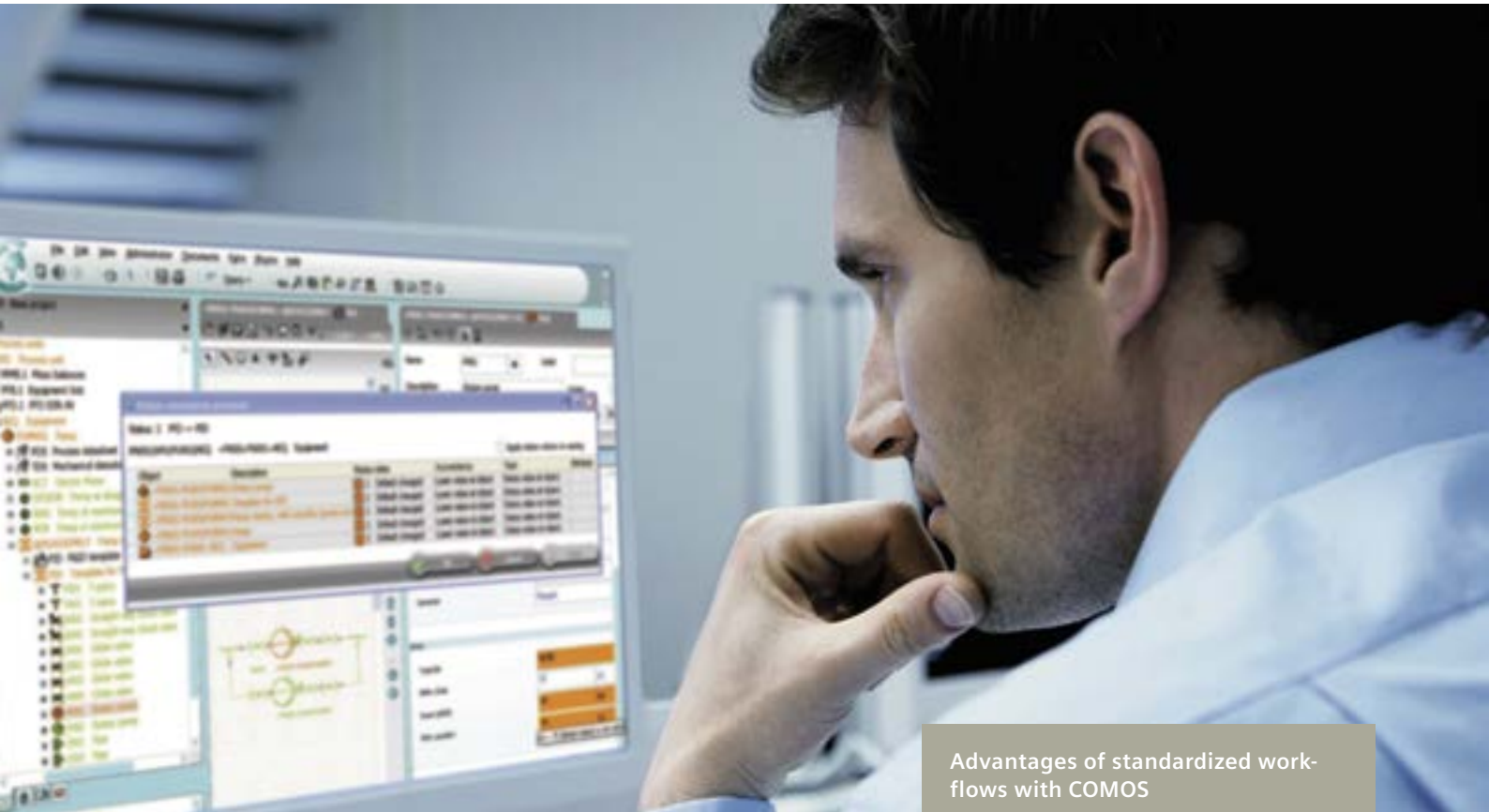
COMOS stands for company-wide workflow optimization

COMOS breaks down the boundaries between all disciplines involved in a plant project, which ensures a seamless flow of information with no loss of data over all lifecycle phases. Projects can be successfully completed even faster through the use of complete, current project and plant documentation that is available everywhere at all times. COMOS creates the framework for extremely efficient workflows and enables companies to achieve a higher quality of interdisciplinary work across all technical areas.

Modular, scalable, and flexible

The COMOS integrated solution concept, with its single data platform, allows technically specialized applications to be combined modularly in order to meet a wide range of different requirements. Our innovative software has an open system architecture that optimizes interdisciplinary cooperation throughout the whole company and is optimally geared to meet the requirements and trends in inter-

national markets. COMOS can be matched to your specific needs quickly and easily, and thanks to intelligent interface technology, it can be integrated in existing system landscapes. Last but not least, thanks to its high level of scalability, COMOS can react promptly to dynamic markets, constantly changing requirements, and increasingly complex product lifecycles.



Complete company-wide solutions

Self-contained solutions are a thing of the past with COMOS. In fields such as process technology, mechanical and electrical engineering, and control technology, data worlds that were formerly separate are combined into a standardized data structure that encompasses the entire plant. They are also systematically networked by means of bidirectional data exchanges with external applications – and integrated in COMOS. This standardized interoperability reduces time and effort for coordination and ensures a higher quality result.

Limitless communication

COMOS provides comprehensive information management worldwide through the use of Web servers. Mobile data management is also possible, for example via iPad applications. Since the connection to the Internet always involves potential risks, proven solutions for secure data exchange offer suitable protection concepts against unauthorized access. COMOS also supports globally operating companies by allowing multilingual operation in multiple languages, thereby facilitating communication between different countries and company locations.

Advantages of standardized workflows with COMOS

- Interdisciplinary functioning across all company levels and locations
- Easy to use, even with large data volumes
- Easily integrated in existing IT landscapes
- Standard data management throughout and up-to-date plant documentation at all times
- Interoperability through open system architecture
- Shorter time-to-market

COMOS offers you software solutions and support for every phase of the plant lifecycle

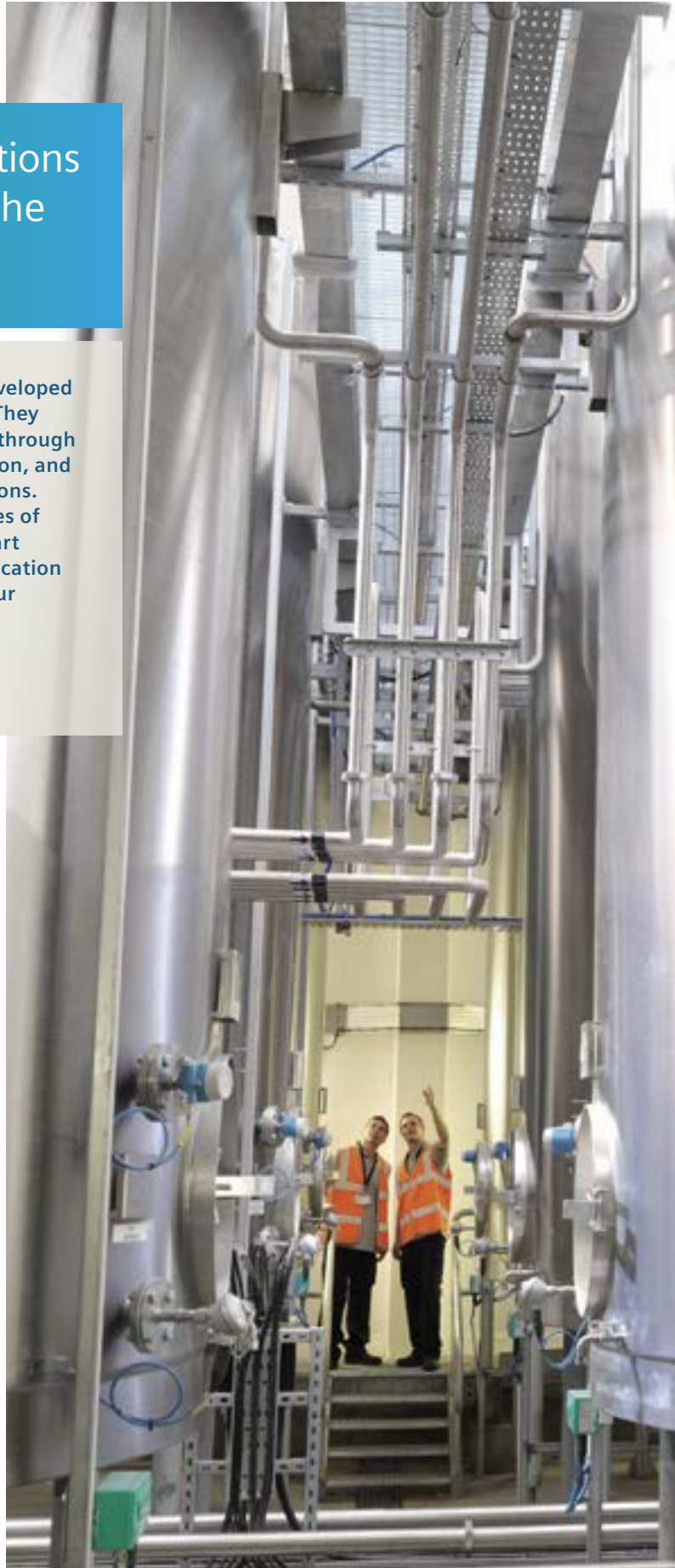
With the COMOS product portfolio, we can deliver fully developed software solutions that are consistent with each other. They cover all phases of the plant lifecycle from process design through basic and detail engineering to operation and modernization, and can be used either as comprehensive or stand-alone solutions. You can rely on our extensive range of services in all phases of your plant's lifecycle. COMOS assists you right from the start with everything from software development through application support. And if desired, qualified experts are on hand at our Training Centers to provide you with in-depth training.

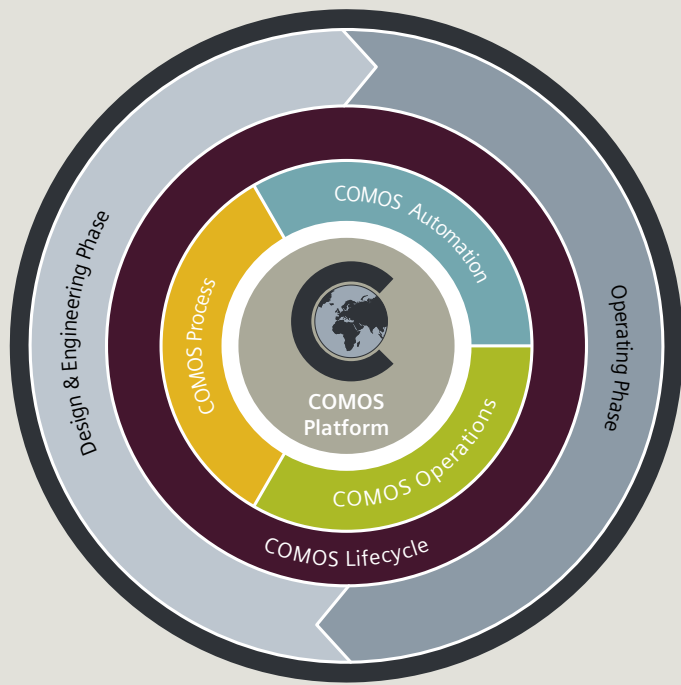
COMOS Platform

The COMOS Platform solution provides the basis for effective overall data management. The data of all applications and domains is stored centrally and in object-oriented form on the COMOS database, providing maximum consistency. Changes made in one application are immediately available in all other applications, so COMOS requires no internal interfaces. Connection to third-party systems is enabled by an open system architecture featuring multiple automated interfaces.

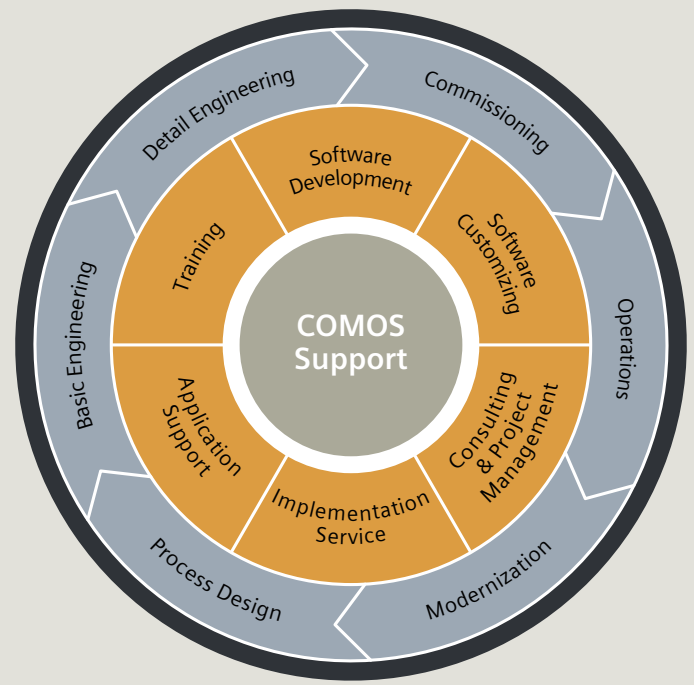
COMOS Process

The COMOS Process solution combines applications for creating process data and all aspects of process engineering. Even at the early design stage, plant layout data can be used to generate process flow diagrams, which are then represented in more detail in the piping and instrumentation diagram. COMOS Process supports quality-controlled pipe engineering and pipe spec management conforming to international industry standards. Process data conversion on the geometry level in the form of isometrics and 3D images can be easily derived from the given data.





Bringing together the engineering and operating phases



Take advantage of our comprehensive and innovative software solution and service offerings

COMOS Automation

The solution COMOS Automation supports electrical engineering for the plant through to full automation covering all processes relevant to electrical, instrumentation and control engineering by specialized solutions. Among other things, logical inter-object links and automated sequences are graphically mapped in diagrams and hydraulic as well as pneumatic workflow schemes are created on the basis of existing data. The integration of COMOS and the SIMATIC PCS 7 process control system makes it possible to combine data from concurrent work processes and operations.

At the press of a button, the entire plant structure is generated from the control system engineering. Based on this data, virtual commissioning can also be performed through the seamless connection with SIMIT. Standard engineering over the entire lifecycle leads to closer cooperation between plant design and operation. This simplifies decision-making processes and minimizes costs for plant management.

COMOS Operations

COMOS Operations is the first choice when it comes to implementing an efficient plant support strategy. All data from the engineering phase can be reused in the operational phase. Solutions are available for the planning, execution and analysis of maintenance measures during operations. Efficient support in the management of shutdowns or inspections as well as the connection of portable devices

is also provided. Via special user interfaces, the measures initiated in the field or workshop can be directly reported. In addition, the integration of COMOS and SIMATIC PCS 7 allows the intelligent use of operating data and, based on this, the implementation of condition-based maintenance strategies. A further lever to increase plant availability is the joint use of COMOS and XHQ – Operations Intelligence.

COMOS Lifecycle

COMOS Lifecycle allows comprehensive information management throughout all plant lifecycle phases, regardless of functional assignment. This allows you to profit from maximum reliability in decision-making and from worldwide access to data and documents, for example, via mobile terminals and through the integration of SharePoint sites. The powerful 3D virtual reality visualization with COMOS Walkinside enables the data generated during engineering to be used to create a “digital twin” of the plant. This can be used as a shared portal to the plant data for all persons involved in the project in order to obtain a common understanding of the project’s status. It can also be used for effective training of maintenance teams, for example.



COMOS supports your success

Our undisputed technology expertise and our comprehensive industry experience are reflected in COMOS. This is why plant engineers and operators over the world in many different industries rely on our innovative software solutions – to consistently increase the success of their companies through efficient plant management.

Even though COMOS perfectly matches the specific requirements of industrial sectors, our pioneering software solutions are equally at home in all process industries.

We work closely with our customers all over the world on the development of our software solutions. We receive valuable input from our customers in the form of questions and tasks and through praise and criticism. We make use of all the feedback that we receive – to the ultimate benefit of our customers.

Expertise from the world's leading industry partner

COMOS is an integral component of Siemens' comprehensive portfolio of products for industry. As a result, you benefit from the ready availability of our experience and our expertise. As a global player, Siemens offers you a closely meshed company network that is unique in the world and is also employed for the marketing, service, and support of COMOS. This means that you always profit from optimal support that covers every aspect of the efficient lifecycle management of your plants.

Examples of successful plant management with COMOS

Plant engineers and operators all over the world rely on our solutions for professional plant management. See for yourself how our customers in different sectors profit from COMOS.



Pharmaceuticals

"Internal studies show we have achieved engineering savings of between 8 and 12 percent by using COMOS software."

**Christoph Jauslin, Head of Engineering IT,
Novartis Pharma AG, Switzerland**

"...savings of 20 percent still represent an understatement for the field of function planning and automation software creation, where many 'homespun' concepts are still employed."

**Dr. Thomas Tauchnitz, Head of Engineering,
Technology Process Group,
Sanofi-Aventis Deutschland GmbH,
Germany**



Chemicals

"Wacker's engineering tool philosophy is characterized by central data maintenance and decentralized usage by our suppliers. Since the introduction of the COMOS integrated engineering solution, this concept has been optimally supported. In addition to enhanced up-to-dateness of the documentation and higher data security, savings concerning data exchange and interfaces have become possible. Moreover, we identified further saving potential for the future."

**Klaus Kraml, Senior Manager,
CAx-Systems & Applications, Engineering Services,
Wacker Chemie AG, Burghausen, Germany**



Oil & Gas

"Above all, it was the object-oriented database structure of COMOS that convinced us. This directly met many of our requirements for an integrated process development platform. Using this approach, we can supply even better products to our customers."

**Zhu Chun Tian, Sr. Vice President,
Sinopec Engineering Incorporation**

"We have been using COMOS since 2006 and already had major benefits. Since then, not only our engineering time has increased, but it has also gotten more consistent. Due to COMOS, we are having great results in our projects."

**Leonardo Luiz Freitas Santos,
Petrobras Petr leo Brasileiro S.A.**



Energy & power plant technology

"The service concept of COMOS offers us competent and efficient support for the adaptation of our data model. This enables us to promptly implement individual proposals or even overall solutions ourselves or commission their speedy implementation."

**Ralf Bergemann, CAE/CAD Coordinator,
Vattenfall Europe PowerConsult GmbH**

Short and to the point

We hope you now have a good idea what COMOS can do and we have sparked your interest in our pioneering solutions for more efficient plant lifecycle management. Here is a brief explanation of some of the terms used in connection with COMOS.

As-built status

As-built status is the term used to describe the actual status of a process plant at the present time. Because the COMOS database is always up-to-date, it can be accessed at any time using the system.

Concurrent processing

The individual design steps are not processed sequentially but concurrently, to a large extent, using simultaneous engineering. This concurrent processing of independent operations and overlapping of independent work steps with a continuous exchange of information saves time and money in the complete project.

Data consistency

Data is entered only once and is then available to all stakeholders anytime and everywhere. Stringent inheritance and linkage mechanisms provide all stakeholders involved in a project with access to up-to-date and consistent data from any location and at all times.

Data integration

Data integration brings information together from various data sources to construct a common data model with a standard structure. In software engineering, data integration extends from linking different applications up to the central provision of data and services on a unified user interface.

File transparency

The integral function-oriented mapping of the plant enables standard communication across all levels. Consistent data is available to everyone involved in the project on a uniform data platform without any data loss. The complete documentation can therefore be reproduced at any time.

Global collaboration

Everyone working on a project has constant access to a consistent database that is always up-to-date, independent of time zones and in real time. This reduces time-consuming and data-intensive exchange processes. All work processes between different locations are sped up and optimized.

Interoperability

Interoperability is the ability of mutually independent systems and technologies to smoothly collaborate by complying with common standards. Information can be efficiently provided without the need for specific inter-system arrangements. This facilitates quick and reliable worldwide decision-making around the clock.

Object orientation in COMOS

In COMOS, all data relating to the same component (a pump, for example) form a unit – an object. Changes to object specifications are stored in the central COMOS database so that the updated data is available everywhere and at all times.

Open system architecture

COMOS' open system architecture provides an optimal framework for integrating third-party systems. The software can be adapted perfectly to operation-specific requirements and can be seamlessly integrated into existing IT landscapes. As a result, it makes a big contribution to the homogenization of a company's software applications.

Plant lifecycle

The lifecycle of a plant can be divided into a number of different phases: process design, basic and detail engineering, start-up and operation, maintenance and modernization. COMOS covers all of these phases – with individual solutions.



COMOS – Making data work. For you too!

We are quite certain that your plant data and information are the key to unlocking your potential. If you like to know why we are so sure about this, you should speak personally to one of our experts. Just get in touch with us. We are there for you at all times!

If you like more information here and now,
visit our website:

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Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens' products and solutions only form one element of such a concept.

Customer is responsible to prevent unauthorized access to its plants, systems, machines and networks. Systems, machines and components should only be connected to the enterprise network or the internet if and to the extent necessary and with appropriate security measures (e.g. use of firewalls and network segmentation) in place.

Additionally, Siemens' guidance on appropriate security measures should be taken into account. For more information about industrial security, please visit <http://www.siemens.com/industrialsecurity>.

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends to apply product updates as soon as available and to always use the latest product versions. Use of product versions that are no longer supported, and failure to apply latest updates may increase customer's exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed under <http://www.siemens.com/industrialsecurity>.

